CHAPTER 3

METHODOLOGY

3.1 Laboratory Testing

Laboratory test were conducted to determine strength parameters and consolidation parameters of soft clay reinforced with encapsulated bottom ash column. All experiments in this study conducted in the Soil Mechanics and Geotechnical Laboratory, FKASA, UMP. All the laboratory experiments were performed with stone column surrounded by kaolin S300. Experiments were carried out on standards set in the British Standard (BS) that includes all preparation materials testing and laboratory testing for kaolin and bottom ash column. The experiments intended to study the basic and mechanical properties of kaolin and bottom ash. The main test that was used for strength parameters is Unconsolidated Undrained Test.

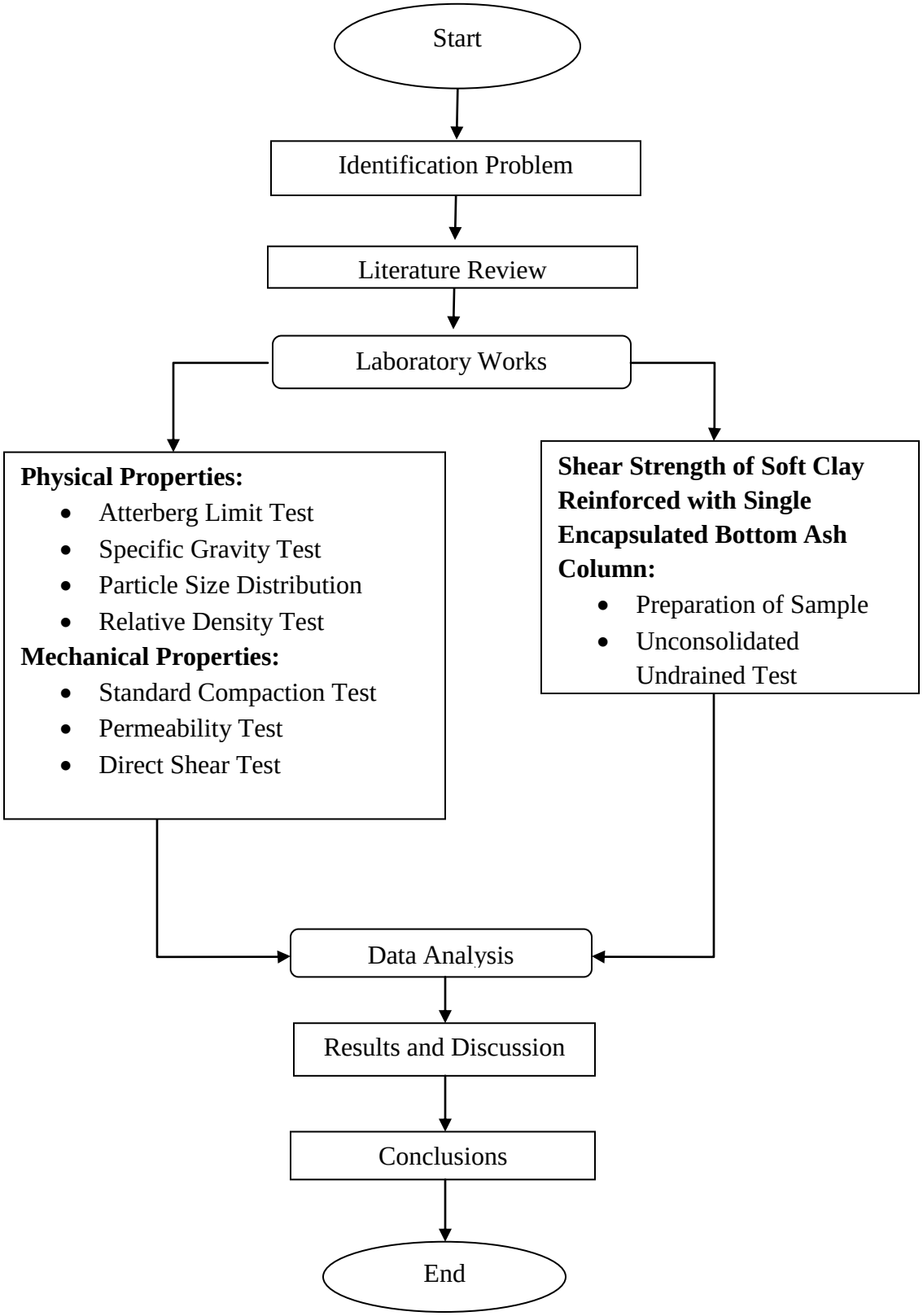

Figure 3.1: Laboratory Flow Chart of Research Methodology

3.2 Preliminary Test

The testing of this study involved bottom ash and kaolin. The bottom ash used for this study is collected from Tanjung Bin Power Plant, Pontian, Johor, Malaysia. The power plant is owned and operated by Tanjung Bin Power Sdn. Bhd. which is subsidiary of Malakoff Corporation Bhd. The tests were conducted for bottom ash and kaolin was Atterberg Limits Test, Specific Gravity Test, Standard Proctor Compaction Test, Sieve Analysis Test, Permeability Test and Unconsolidated Undrained Triaxial Test. All the experiments were carried out using 38 mm diameter and76 mm height of kaolin. The diameter of bottom ash used is 6 mm and 8 mm with heights 38 mm, 57 mm and 76 mm. The summary of laboratory testing programme and standard used shown in Table 3.2.

Table 3.1: The summary of laboratory testing programme and standard

Material	Test Name	Standard
Kaolin	Atterberg Limit Test	Bs 1377 : Part 2 : 1990 : 4.3 & 5.3
	Hydrometer Test	Bs 1377 : Part 2 : 1990 : 9.5
	Standard Compaction Test	Bs 1377 : Part 4 : 1990 : 3.3
	Particle Density Test	Bs 1377 : Part 2 : 1990 : 8.3
	Falling Head (Permeability Test)	ASTM D 2434
Bottom ash	Direct Shear Test	Bs 1377 : Part 4 : 1990
	Sieve Analysis	Bs 1377 : Part 2 : 1990 : 9.3
	Particle Density Test	Bs 1377 : Part 2 : 1990 : 8.3
	Standard Compaction Test	Bs 1377 : Part 4 : 1990 : 3.3
	Relative Density Test	ASTM D 4253
	Constant Head (Permeability test)	ASTM D 2434
Soft Clay Reinforced with Encapsulated Bottom Ash Columns	Unconsolidated -Undrained Test	ASTM D 2166